

Comprehensive testing of 3rd generation mobile communications equipment according to the 3GPP specification

Photo 43413-1



Brief description

The 3G Air Interface Simulator TS8950 is a test system designed for comprehensive testing of 3rd generation mobile communications equipment according to the 3GPP specification (as far as available at the moment). It consists of standard test instruments from Rohde&Schwarz and additional OEM components.

The overall conceptual guidelines of the system design - flexibility and openness – shall guarantee adherence to the ongoing evolution of the 3G standard. In order to provide the appropriate test functionality right in time, the initial configuration of TS8950 will be upgradeable in three steps (A, B, C) thus matching with the testing needs in all phases of 3G product development.

During gradual evolution of TS8950 the range of applications spans from:

- Step A: RF testing without signalling (Tx basic measurements)
- Step B: RF testing with basic L1 signalling (Rx and Tx/Rx advanced meas.)
- Step C : RF testing with L1-L3 signalling (Full Tx/Rx conformance test)

Convenient access to any application range

Because of the ongoing development of the test specifications, defined test cases are not yet available. The test system therefore provides different types of access to the individual layers of the system software for generating customized test sequences. Access is either in the form of a dialog via the graphical user interface AUP (advanced user panel) or on the application programming interfaces API.

At the device level, a separate dialog is available for each system component that can be remotely controlled via a defined interface. The instrument dialogs are tailored to 3G requirements and organized in logical blocks for emulating mobile radios, base stations and services. Entries can also be made for individual device command strings, eg GPIB commands. Every instrument dialog comprises a macro recorder/player for recording and replay of specific device settings (macros).

Rx/Tx measurements and result analysis at the system level are also dialog-controlled. The AUP provides a defined script for each measurement which can be edited and extended. This plain command file (PCF) allows direct addressing of the device layer and thus direct access to the individual instruments including the switching

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and conditioning unit. With the aid of a macro sequence manager, individual macros can be combined into sequences permitting complex measurements.

User management ensures that simultaneous access by different users does not cause a configuration conflict. Of course this restriction does not apply to simultaneous access of test results for analysis. A logging mechanism stores all the settings made.

The AUP also supports service dialogs that perform fully automatic RF path compensation, for instance, or simplify system maintenance and configuration by selftest and diagnostic routines of individual components. The RF compensation routines of Signal Switching and Conditioning Unit SSCU need not follow fixed test-case patterns but can be started in compliance with user specifications.

Available and planned configuration levels of TS8950

The application range of the presently available TS8950A system covers basic Rx/Tx tests without signalling.

This includes the following measurements at the transmitter end:

- frequency stability,
- occupied bandwidth,
- maximum output power,
- adjacent-channel leakage power,
- spurious emissions,
- transmitter intermodulation,
- transmitter on/off ratio,
- modulation accuracy, (EVM, rho factor),
- code domain power analysis (offline).

The following can be measured at the receiver end:

- sensitivity,
- selectivity (eg adjacent-channel selectivity, blocking).

The subsequent model TS8950B extends the application spectrum especially by performance tests requiring coding/decoding. The transmitter measurements of this system include:

- code domain power analysis,
- output power control (inner loop, outer loop).

Additional measurements at the receiver end:

- spurious emission,
- receiver intermodulation,
- spurious response and blocking,
- receiver dynamic range.

Model TS8950C finally performs all conformance measurements including complete layer 1 to layer 3 signalling.